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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/724,915	12/01/2003	Kuo-Ming Wu	250907-1220	1848

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EXAMINER
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FILE, ERIN M

ART UNIT	PAPER NUMBER
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2611

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	01/10/2007	PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/724,915	<b>Applicant(s)</b> WU ET AL.	
	<b>Examiner</b> Erin M. File	<b>Art Unit</b> 2611	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 01 December 2003.
- 2a) ☐ This action is FINAL.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1-14 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1,2,4,5,7,8,10,11,13,14 is/are rejected.
- 7) ☐ Claim(s) 3,6,9 and 12 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 01 December 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                                | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                       | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## DETAILED ACTION

### ***Claim Rejections - 35 USC § 103***

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1, 2, 7, and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Azadet (U.S. Pub. No. 2002/0083396) in view of Hatakeyama (U.S. Patent No. 5,923,713).

**Claims 1, 7, Azadet discloses:**

- a best survivor unit for receiving path metrics of local winner states from which a best state is selected every L iterations, wherein said local winner states are chosen from pairs of odd and even states (computed new path metrics are used to determine the best survivor path and path metric for a corresponding state, [0010], lines 21-23);
- a survivor memory comprising a register-exchange network for receiving decision bits of states and generating decision vectors of survivor paths leading to said states at instant i according to said decision bits of said states from instant -L to instant i, said decision vectors of said states are output every L iterations, and each of said decision vectors has a length of L bits (survivor memory unit, SMU, 430, SMU 430 keeps track of the S

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survivor paths, [0041], line 7, see fig. 18, which illustrates an iterative embodiment of SMU, [0031])

- a trace-back unit for storing said decision vectors and finding a global survivor path sequence by following said decision vectors back from the best state at instant  $i-L$ , such that  $L$  decoded bits are output every  $L$  iterations ([0069], lines 11-15, [0059]).

Azadet fails to disclose the survivor memory divides the decision vectors into even and odd states, however, Hatakeyama discloses generating decision vectors of survivor paths wherein said states are divided into pairs of odd and even states (abstract). Hatakeyama further discloses that this decoding method has the advantages of reducing the access times of the path metric memory, lowering power consumption, and speeding up Viterbi decoding (abstract, lines 1-3), it would have been obvious to one skilled in the art at the time of invention to incorporate the even odd memory storing as disclosed by Hatakeyama into the combined invention of Azadet and Hatakeyama. Neither Azadet nor Hatakeyama disclose expressly  $2^{K-2}$  local winner states selected from  $2^{K-1}$  states. At the time the invention was made, it would have been obvious to a person of ordinary skill in the art to select values of  $2^{K-2}$  local winner states selected from  $2^{K-1}$  states. Applicant has not disclosed that selecting values of  $2^{K-2}$  local winner states selected from  $2^{K-1}$  states provides an advantage, is used for a particular purpose, or solves a stated problem. One of ordinary skill in the art, furthermore, would have expected Applicant's invention to perform equally well with the combined invention of Azadet and Hatakeyama. Therefore, it would have been

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obvious to one of ordinary skill in this art to modify Azadet to obtain the invention as specified in claims 1 and 7.

**Claims 2, 8,** Azadet further discloses said best survivor unit comprises  $2^{K-1}$  comparators for choosing the best state among said  $2^{K-2}$  local winner states by comparing said path metrics of said  $2^{K-2}$  local winner states in L-1 iterations (the best survivor is selected using the ACS, [0039], lines 1-3, illustrated in fig. 5, which has a plurality of comparators 520, see also [0042]).

3. Claims 4, 5, 10, and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Azadet (U.S. Pub. No. 2002/0083396) and Hatakeyama (U.S. Patent No. 5,923,713) as applied to claims 1 and 7 above, and further in view of Ghosh et al. (U.S. Pub. No. 2006/0114981).

**Claims 4, 10,** neither Azadet nor Hatakeyama disclose the number of L is equal to a divisible factor of a data payload length for a conformant 802.11g system, however, Ghosh discloses a data payload length for a conformant 802.11g system ([0033]). Because Ghosh discloses her system allows 802.11g systems to be less sensitive to interference (abstract, lines 12-13), it would have been obvious to one skilled in the art at the time of invention to incorporate the 802.11g conformant decoder as disclosed by Ghosh into the combined invention of Azadet and Hatakeyama.

**Claims 5, 11,** The combined invention of Azadet, Hatakeyama, and Ghosh does not disclose expressly L is equal to 8. At the time the invention was made, it would have been obvious to a person of ordinary skill in the art to choose a

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number of  $L$  iterations to be equal to 8. Applicant has not disclosed that the value of  $L=8$  provides an advantage, is used for a particular purpose, or solves a stated problem. One of ordinary skill in the art, furthermore, would have expected Applicant's invention to perform equally well with the combined invention of Azadet, Hatakeyama, and Ghosh. Therefore, it would have been obvious to one of ordinary skill in this art to modify the combined invention of Azadet, Hatakeyama, and Ghosh to obtain the invention as specified in claims 5 and 11.

4. Claims 13 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Azadet (U.S. Pub. No. 2002/0083396) and Hatakeyama (U.S. Patent No. 5,923,713) as applied to claim 7 above, and further in view of Ahmed et al. (U.S. Patent No. 6,883,021).

**Claim 13**, neither Azadet nor Hatakeyama disclose said decision metrics are hard-decision data if quantized to one-bit precision, however, Ahmed discloses decision metrics are hard-decision data if quantized to one-bit precision (col. 7, lines 7-22). Because the use of hard decision data increases the accuracy of the system, it would have been obvious to one skilled in the art at the time of invention to incorporate the hard decision decoding as disclosed by Ahmed into the combined invention of Azadet and Hatakeyama.

**Claim 14**, neither Azadet nor Hatakeyama disclose decision metrics are soft-decision data if quantized with more than one bit of precision, however, Ahmed discloses decision metrics are soft-decision data if quantized with more than one bit of precision (col. 7, lines 7-22). Ahmed further discloses soft decision

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decoding is advantageous because soft decision decoding provides about a 2.2 dB higher energy per bit to the spectral noise ratio at the same bit-error level, thereby providing a signal to noise ratio advantage (col. 7, lines 17-22). Because of this advantage, it would have been obvious to one skilled in the art at the time of invention to incorporate the soft decision decoding as disclosed by Ahmed into the combined invention of Azadet and Hatakeyama.

***Allowable Subject Matter***

5. Claims 3, 6, 9, 12 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Erin M. File whose telephone number is (571)272-6040. The examiner can normally be reached on M-F 1:00PM-9:30PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mohammad Ghayour can be reached on (571) 272-3021. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Erin M. File



1/6/2007

  
MOHAMMED GHAYOUR  
SUPERVISORY PATENT EXAMINER